IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicants:	M. OOE, et al.
Serial No.:	10/585,738
Filed:	JULY 12, 2006
For:	PHOTOSENSITIVE POLYMER COMPOSITION, METHOD OF PRODUCING PATTERN AND ELECTRONIC PARTS
Group AU:	1794
Examiner:	Gerard T. Higgins
Confirm. No.:	7230

DECLARATION UNDER 37 CFR 1.132

Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

Sir:

I, Masayuki Ooe, a citizen of Japan, residing at 2-24-6, Juou-cho, Hitachi City, Ibaraki, Japan, do hereby declare that:

I graduated in 1987 from the School of Interdisciplinary Science and Engineering in the Graduate School of Kyushu University, Department of Molecular Engineering.

I joined Hitachi Chemical Co., Ltd. in October 1996, and transferred to Hitachi Chemical DuPont Microsystems Ltd. in November 1997, and my present area of research is investigation into development and mass production of new photosensitive, alkali-developed, positive-type polyimides and polybenzoxazoles.

I am one of the inventors named in U.S. Patent Application No. 10/585,738, filed July 12, 2006 (hereinafter "the above-identified application"), and I am familiar with the Office Action mailed April 14, 2011, therein.

I previously conducted experiments to investigate the proper exposure amount and, therefore, sensitivity of photosensitive polymer compositions containing a polyamide (component (a)) and a compound which generates an acid upon receiving light (component (b)) within the scope of claim 1 in the above-identified application, and containing various cross-linkers.

During the interview with Examiners Higgins and Ruthkosky on August 2, 2011, I presented a table containing sensitivity values for Example 1 of the above-identified application, Comparative Example 4, Tadayuki '268 and Tadayuki '063. In that table, the sensitivity values for Example 1 of the above-identified application and Comparative Example 4 for a 7.5-7.6μm film and for Tadayuki '268 and Tadayuki '063 for a 11.7-12.1μm film were calculated values. Examiners Higgins and Ruthkosky requested an explanation of how these values were calculated. An explanation of how these values were calculated follows.

The table below shows the data for pre-baked film thickness and Eth for our current aqueous positive materials.

Table1. PBt vs. Eth for aqueous positive materials

Items	Unit	Product A		
PBt*1	um	7.1	11.4	12.9
Eth*2	mJ/cm^2	140	270	320

*1: Film thickness after pre-baking
*2: Threshold exposure energy for pattern opening

These data are plotted in Fig.1 below. As can be seen from Fig.1, Eth increases linearly by increasing pre-baked film thickness. There are good correlations between pre-baked film thickness and Eth when the data are approximated by linear function.

The composition of Product A (applicants' product) is almost same as the composition disclosed in Example1. If the compositions are almost same, the slope in the linear function and the correlation between film thickness and Eth will be almost same.

The polymer comprised in Product A is almost same as the polymer that is disclosed in Example1. The polymer in Product A is synthesized from 4,4'-dicarboxydiphenylether, 2,2-bis(3-amino-4-hydroxyphenyl)-1,1,1,3,3,3-hexafluoropropane and 3-aminophenol. Although there is a difference in the terminal group in the polymer between product A and Example 1, this difference does not affect the correlation between pre-baked film thickness and Eth.

The photosensitizer comprised in Product A is naphthoquinonediazidesulfonyl ester. It is same as the photosensitizer used in Example1.

The Adhesion promoter, dissolution inhibitor and solvent of Product A are different from Example 1, but this does not affect the correlation.

If the polymer and photosensitizer are almost same, the slope of the linear function would show almost the same trend.

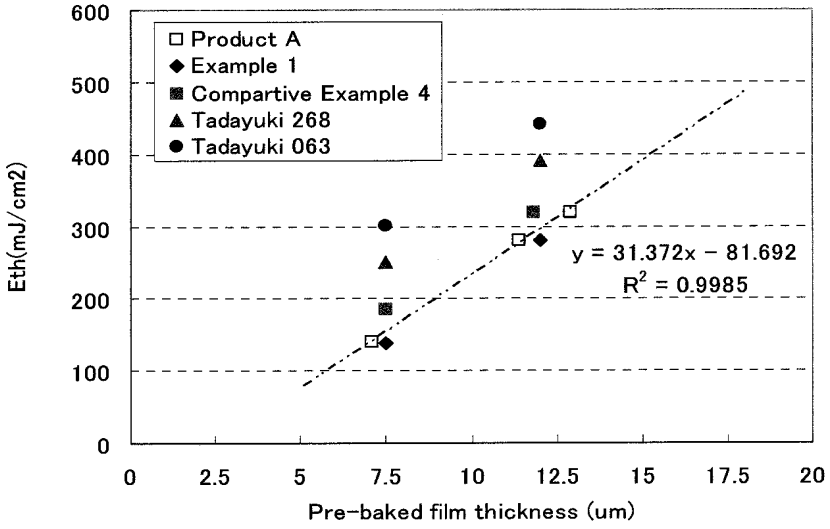

Fig1. Pre-baked film thickness vs. Eth

We calculated the Eth for the different film thicknesses by using the equation 'Y= 31.372X – b'. The results are shown in Table 2 below.

Table2. The caluculated results of Eth

	Actual data		b*1	Calculated value	
	Film thickness (um)	Eth (mJ/cm^2)		Film thickness (um)	Eth (mJ/cm^2)
Example 1	12	280	−96.464	7.5	139
Compartive Example 4	11.8	320	−50.1896	7.5	185
Tadayuki 268	7.5	250	14.71	12	391
Tadayuki 063	7.5	300	64.71	12	441

*1: Calculated value from the equation Y = 31.372X−b

The calculated data are also plotted in Figure1. The calculated data show some small differences from the data presented in the interview with the Examiners.

I further declare that all statement made herein of my knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine, or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

Oct. 17, 2011
Date

Masayuki Ooe
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